Competition, invasion effects versus invasiveness and fuzzy classification

J. Bastow Wilson, Alessandro Chiarucci, Milan Chytrý & Meelis Pärtel

Editors’ Award for 2010

Each year, the Chief Editors select the paper in the Journal of Vegetation Science that most impressed them, and that they would like to hold up as an example. The author receives Wiley-Blackwell books of their choice to the value of £100, a certificate and an entry in the Editors’ Award roll of honour on the Journal’s web site. This year, we should also like to commend two other papers.

Competition: importance, intensity, effect and response

For 2010, the Editors’ Award goes to Carlyle et al. (2010). Competition underlines the whole of vegetation science, and is examined or invoked in many of the papers in the Journal of Vegetation Science. Some papers have explored it explicitly. The current question of the balance between competition and facilitation – when will one dominate and when the other? – is well dealt with in the Journal: e.g. Halpern et al. (2010) examining the shift during succession in a forest-meadow mosaic in Oregon, Villarreal-Barajas & Martorell (2009) finding that facilitation was more important in disturbed sites in semi-arid grassland in Mexico, and Onipchenko et al. (2009) testing the effect of environmental stress on the facilitation/competition balance in alpine Russia.

Whether competition is weaker in stress environments is the most crucial issue of the Grime versus Tilman debate (Craine 2005). It has been suggested that the two protagonists are talking at cross purposes, one about the importance of competition and the other about the intensity of competition (Brooker & Kikvidze 2008), and this has already been addressed in the Journal (Jung et al. 2009, working in floodplain meadows in Luxembourg; Liancourt et al. 2009 working in grasslands in the French Alps).

Carlyle et al. (2010) improved on this in three ways. Firstly, much previous work has relied on an implied stress gradient, observed in the field, with “stress” assumed from standing crop or some measured environmental factor. Carlyle et al. imposed both water stress and nutrient stress experimentally. Secondly, Carlyle et al. addressed, via a clipping treatment, another prediction of Grime’s CSR theory (Grime 2001), and a question that has been asked elsewhere (Wilson & Keddy 1986): whether competition is reduced under disturbance. Thirdly, they used five indices of competition to separate intensity, effect, response and importance. They were able to reach a more definitive conclusion than previous work on when competition is greater, and in what sense, and to how this can reconcile the Grime versus Tilman theories.

Invasion effects versus invasiveness

The effects of invasion by exotic plant species – and by native species – have generated huge interest in the past decade. Many papers in the Journal of Vegetation Science have addressed this issue, e.g. considering the impact of invasions on seed banks (Gioria & Osborne 2009), the effects of one exotic species (Solidago gigantea) on a range of ecosystem properties in Swiss grasslands and wetlands (Scharfy et al. 2009), and the way the litter of invasive exotic grass species can facilitate the growth of native shrubs (Wolkovich et al. 2009). But the resident community can also affect the invaders, for example Halpern et al. (2010) demonstrated that invasion by Pinus contorta and Abies grandis into mountain grassland could be controlled by the existing herbaceous community. The two processes can be happening at the same time: Rodríguez-Buriticá & Miriti (2009) demonstrated that, in a Californian desert, native Ambrosia dumosa shrubs facilitated the invasion of the exotic grass Schismus barbatus, but the invader then interfered with the native’s regeneration. “Biting the hand that feeds it” they said.
The issue of cause and effect arises also with the relation between the species diversity of a community and its invisibility. This has been a controversial issue (Lilley & Vellend 2009), but it is clear that often communities that have suffered exotic invasion are species-poor.

We offer an Editors’ commendation to Thiele et al. (2010), who ask which comes first, the chicken or the egg? Does low native plant diversity make invasion easier, or does the invasion reduce the diversity of the invaded community? We usually see invasions after they have happened, but Thiele et al. use the differently predicted response of small and large plant species in the invaded community to conclude that it is basically the invaders that are displacing native species. There are implications for conservation management here.

Fuzzy classification

The Journal of Vegetation Science derives from the founding in 1947 of the journal Vegetatio, by the same group of scientists who founded the International Association for Vegetation Science (IAVS). Then, J. Braun-Blanquet (1948) looked forward to “La Phytosociologie moderne” which would give a logical and clear system of classifying vegetation. In 2011, the interests of IAVS and its official journals are much wider than they were in 1947, and include any aspect of the functioning of plant communities. However, the interests in vegetation survey and classification remain. In 1947 the topic was largely restricted to continental Europe, but these days countries worldwide seek to document and conserve their biodiversity.

Phytosociology has modernised further. Traditional phytosociology resulted in a crisp, formal classification, where a sample of vegetation (relevé) was of either one association or another. With the development of methods of numerical classification (Williams & Lambert 1959), phytosociologists adopted them as a starting point for their classifications. Some of the classification methods have been “fuzzy” ones that, rather than conclude a given sample of vegetation is in this association or that, give it a probability of belonging to one association and a probability of belonging to another. In an earlier paper, De Cáceres et al. (2009) had examined whether fuzzy clustering could reproduce the associations described by experts. The use of fuzzy methods is perhaps surprising in view of the formal nature of Braun-Blanquet phytosociology, but De Cáceres et al. (2009) used the fuzziness to identify samples that were transitional between associations and should thus be excluded, long a part of traditional phytosociological methods. But just as there is now a wide range of Williams & Lambert-type classification methods available, there is also a range of fuzzy classification methods.

Our second commendation is to De Cáceres et al. (2010) for their evaluation of three fuzzy classification methods for four tasks: assigning new samples to existing associations (classes), updating existing associations, defining new associations and testing association formed in the traditional way.

Journal developments

The face of the Journal of Vegetation Science has been changing. For 2010, we changed the author names at the head of a paper from the format “Clements, Frederick E.” to “Frederick E. Clements”. The previous format was causing too much confusion. We also placed author address details at the bottom of the page to avoid clutter at the top.

For 2011 we have a new page design, well received as a cleaner and more modern design by the Council of IAVS. The IAVS logo is now on both the cover of the journal and the first page of each article. The Journal of Vegetation Science has been owned by IAVS since its foundation in 1990 and both the Association and the editors are delighted with the support that Wiley-Blackwell and Editorial Office Ltd have given us.

This year, Sandra Díaz resigned as a Chief Editor. We thank her for her enthusiasm and all the work she did for the Journal during the nine years she was with us, seven of them as a Chief Editor. IAVS Council accepted the nomination of Milan Chytrý to replace her. We also thank all the referees who helped us so much with their evaluations of manuscripts (App. 1).

References


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